OMICS TECHNOLOGY IN MEDICINE - METABOLOMICS ANALYSIS OF PLASMA IN DIFFERENT DISEASES

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Introduction: Metabolomics, rapidly evolving field of measuring all endogenous metabolites in a cell or body fluid, provides a functional readout of the physiological state of the human body. Most importantly, genetic variants associated with a specific metabolite level, and with a defined disorder, might provide access to the underlying molecular disease-causing mechanisms. The main goal of this research is identifying metabolically interpretable genetic facrors predispoding to manifestation and progression of various diseases.

Methods: We conducted metabolic studies by the case-control design. There was conducted an isolation of polar and non-polar metabolites from blood plasma, which were further separated into the HILIC bond column by HPLC-MS with the TOF (time-of-flight) detector. The processing of the obtained data was carried out on the public software PCDL Metlin Metabolite Database, XCMSonline. Statistical processing of data was carried out on MetaboAnalyst 3.0.

Results: There was revealed a difference in the spectra and in the amount of metabolites in various pathologies. We have investigated the following diseases: thyroid cancer, childhood food allergy and rheumatoid arthritis. There was revealed difference in the metabolic spectrum in children diagnosed with congenital food allergies in comparison with their parents. Specific biomarkers, such as L-methionine, 3-hydroxy-trimethyl lysine, etc., have been detected in patients diagnosed with thyroid cancer. Fingerprinting analysis of metabolites by free access software revealed differences between the case and control cohorts and also demonstrated notable discrimination between the RA and RA-OP cohorts.

Conclusions: As a result of our research we want to determine specific metabolically interpretable and reliable genetic factors along with metabolic pathways, which might be shared or differed between case and control groups and might provide insight into the extent to which the process of pathological changes occurs and progresses. All over the world, research on the problems of aging is carried out for this purpose and preventive diagnostics, and the prevention of the development of diseases will help healthy longevity.